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Proceedings of the Assessment of 4VWX Herring (*Clupea harengus* L.) Maritimes Regional Science Peer Review

March 26-27, 2013

Bedford Institute of Oceanography
Dartmouth, Nova Scotia

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Foreword

The purpose of these Proceedings is to document the activities and key discussions of the meeting. The Proceedings may include research recommendations, uncertainties, and the rationale for decisions made during the meeting. Proceedings may also document when data, analyses or interpretations were reviewed and rejected on scientific grounds, including the reason(s) for rejection. As such, interpretations and opinions presented in this report individually may be factually incorrect or misleading, but are included to record as faithfully as possible what was considered at the meeting. No statements are to be taken as reflecting the conclusions of the meeting unless they are clearly identified as such. Moreover, further review may result in a change of conclusions where additional information was identified as relevant to the topics being considered, but not available in the timeframe of the meeting. In the rare case when there are formal dissenting views, these are also archived as Annexes to the Proceedings.

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SUMMARY

A Maritimes Region Science Peer Review was conducted on March 26 to 27, 2013, at the Bedford Institute of Oceanography, Dartmouth, Nova Scotia to review an assessment of 4VWX herring. Participation in this meeting included Fisheries and Oceans Canada (DFO), Province of Nova Scotia, Province of New Brunswick, the fishing industry, and aboriginal communities. The results of this meeting will form the basis for scientific advice for fishery management of these stocks.

Compte rendu de l'examen scientifique par les pairs de la Région des Maritimes de l'évaluation du hareng (*Clupea harengus* L.) des divisions 4VWX

SOMMAIRE

Un examen scientifique par des pairs de la Région des Maritimes a été mené les 26 et 27 mars 2013 à l'Institut océanographique de Bedford à Dartmouth (Nouvelle-Écosse) pour examiner une évaluation du hareng des divisions 4VWX. Les participants à cette réunion comprenaient Pêches et Océans Canada, la province de la Nouvelle-Écosse, la province du Nouveau-Brunswick, l'industrie de la pêche et des collectivités autochtones Les résultats de cette réunion serviront de base pour l'avis scientifique sur la gestion de la pêche de ces stocks.

INTRODUCTION

The meeting was convened on March 26th, at 9:00am. The Chair, Kirsten Clark, welcomed the participants and introduced the two reviewers, Brad Hubley and Leslie Naismith from the Population Ecology Division at the Bedford Institute of Oceanography. The meeting Agenda, Terms of Reference and List of Participants can be found in Appendices 1-3, respectively.

These Proceedings are meant to serve as a consensus summary of the meeting's principle discussions and conclusions and are not intended to be a chronological transcript. The Proceedings document complements the Science Advisory Report (SAR) and the supporting Research Documents and is not intended to be used in isolation. The SAR captures the discussion and conclusions of the meeting; the Proceedings document expands on how the conclusions were reached and the major discussion points; the Research Documents provide sufficient detail so analyses can be repeated.

Following the introductions, the Agenda and Terms of Reference were reviewed. It was indicated that there were four working papers for presentation and review:

- Singh, R., D. Knox, M.J. Power, A. MacIntyre, and G.D. Melvin. 2013. 2013 Evaluation of NAFO Divisions 4VWX herring. CSA Working Paper 2013/21.
- Singh, R., G.D. Melvin, and A. Clay. 2013. Summary of the 2011 and 2012 Herring Acoustic Surveys in NAFO Divisions 4VWX. CSA Working Paper 2013/18.
- Melvin, G.D., C.D. Melvin, M.J. Power, S. Osborne, and A. Clay. 2013. Summary of calibration integration factor (CIF) corrections for the 1999-2002 herring acoustic surveys in NAFO Divisions 4VWX. CSA Working Paper 2013/19.
- Melvin, G.D., R. Martin, and M.J. Power. 2013. Estimating German Bank and Scots Bay spawning ground turnover rates from tag returns. CSA Working Paper 2013/20.

The CSAS deadlines for the Stock Advisory Report (SAR), Proceedings and Research Documents were explained. The meeting then commenced with the presentation of the information on the Nova Scotia / Bay of Fundy Spawning Component.

NOVA SCOTIA/BAY OF FUNDY SPAWNING COMPONENT

Working Paper: Singh, R., D. Knox, M.J. Power, A. MacIntyre, and G.D. Melvin. 2013. 2013 Evaluation of NAFO Divisions 4VWX herring. CSA Working Paper 2013/21.

Presenter: Rabindra Singh

PRESENTATION HIGHLIGHTS

The 2011 evaluation of the NAFO Divisions 4VWX herring considered the data from the 2009-2010 quota year. This current 2013 evaluation covers the data from the 2010-2011 and 2011-2012 quota years. Quota landings of Atlantic herring (*Clupea harengus*) in 2010-2011 were 50,010t and in 2011-2012 were 47,614t against a Total Allowable Catch (TAC) of 50,000t for each quota year for the Southwest Nova Scotia/Bay of Fundy (SWNS/BoF) component. Acoustic biomass estimates increased substantially by 43% in 2011 followed by a further 6% in 2012 for the major spawning ground survey areas in Scots Bay and on German Bank. Most of this increase occurred in Scots Bay. In 2011, the fishery catch at age composition by number was comprised of 12% fish at age 2, 46% fish at age 3, 22% at age 4, and only 9% at ages older than age 5. In 2012, the fishery catch at age composition by number was comprised of 25% fish at age 2, 13% at age 3 years of age, 27% at age 4, and 15% at ages older than age 5.

The lack of widespread distribution of 2 years olds and their absence from the weirs is a cause for concern about the expected numbers of 3 year olds in 2013.

COMMENTS AND DISCUSSION

An overall comment was made that a lot of information was presented at this assessment meeting but the reason for the presentation of some of this information was not always clear. A suggestion was made to condense or show less and to focus on information that addresses specific points.

Objectives and Management

It was noted that the second point under Objectives and Management was that in order to prevent growth over fishing, fishing mortality should be at or below $F_{0.1}$. However, because there is currently no analytical assessment for this spawning component, there is no estimate of $F_{0.1}$.

Fishery

Catches from what was defined as the German Bank spawning area in the working paper and the area referred to as the German Bank spawning box were reported. Those from the spawning box were higher than those from the fishing grounds. This was questioned since most were under the impression that the spawning box was smaller than the defined fishing grounds. It was indicated that the spawning box covers a slightly different area, hence the higher catch but this was not clear from the figures.

Action: Herring team to provide a single figure showing both the German Bank fishing grounds and the spawning box and an explanation of the difference in the catches.

There was a question of clarification regarding what constituted the fall and summer purse seine fisheries. The fall fishery was conducted in the area around Grand Manan and the Bay of Fundy in the new fishing year (October 15 until the end of November). The summer fishery was conducted throughout the summer and fall and included the fishing on the spawning grounds.

The 2008 and 2010 year-classes were dominant in the catch in 2012 but there was a decrease in 3 year olds from 2011 to 2012, indicating that the 2009 year-class was weaker. The proportion of the catch older than age five increased in 2012 from 2011, which was a good sign, but the historical time series of catch at age still showed few fish older than age 8 since 1995. The 2008 year class could be seen tracking through the fishery at ages 2, 3 and 4. Industry representatives indicated that this showed the success of their approach of avoiding catches of small (primarily age 2) fish.

The working paper contained a bubble plot for the fishery catch at age for the whole SWNS/BoF spawning component and for the acoustic survey catch at age for German Bank, but no bubble plot for the acoustic survey catch at age for Scots Bay.

Action: Include a bubble plot for the acoustic survey catch at age for Scots Bay in the final research document.

The 2011 and 2012 fishery weighted average weights at age were similar to the most recent 5-year and 10-year averages, which were consistently lighter than the long term average. It was noted that this was not the case for ages 1 and 2, when the fish were growing rapidly and there was no density dependence. It was noted that there has been a general trend in decline of weight at age in many fish species, including groundfish, and therefore their concern was expressed that this was a systematic change. In the past temperature, salinity, chlorophyll and

other factors have been examined to see if there was a link. These factors are often very variable, but may show an overall trend.

It was also noted that it seems that when there is an improvement in condition in the Bay of Fundy scallops, this is also seen in herring. Although it is hard to directly relate condition in herring to that of scallops because many factors are involved, a general increase in production could translate into improved condition in both.

Discussion on working paper 2013/21 was suspended at this point when the working paper on the acoustic surveys (2013/18) was presented.

Working Paper: Singh, R., G.D. Melvin, and A. Clay. 2013. Summary of the 2011 and 2012 Herring Acoustic Surveys in NAFO Divisions 4VWX. CSA Working Paper 2013/18.

Presenter: Rabindra Singh

PRESENTATION HIGHLIGHTS

Automated acoustic recording systems deployed on commercial fishing vessels have been used since 1997 to document the distribution and relative abundance of Atlantic herring from industry vessel surveys and fishing excursions in the Bay of Fundy and coastal Nova Scotia area within Northwest Atlantic Fisheries Organization (NAFO) divisions 4VWX. In 2011 and 2012, regularly scheduled surveys at approximately 14 day intervals were again conducted on the main spawning components, and the spawning stock biomass for each component estimated by summing these results. In each of 2011 and 2012, five structured surveys were conducted in Scots Bay and three on Trinity Ledge. One structured survey was done in 2011 on Spectacle Buoy. In 2011, there were five surveys on German Bank and six in 2012. In most cases, these surveys provided good coverage of the spawning areas consistent with established protocols.

In 2011, the biomass estimate increased by almost 43% above the 2010 estimate for the combined survey areas of Scots Bay, Trinity Ledge and German Bank. The 2012 estimate for the same overall areas increased a further 6% over the 2011 estimate. As a result, the overall estimate is now closer to the long term average. These estimates indicated positive growth in the 4X stock but most of this growth occurred in the Scots Bay survey area and not on German Bank which has historically been the major spawning area.

Biomass estimates from surveys of the coastal Nova Scotia spawning components for the Little Hope/Port Mouton, Halifax/Eastern Shore and Glace Bay areas were also examined. Six (2011) and two (2012) surveys were completed for Little Hope, three (2011) and two (2012) surveys for Halifax/Eastern Shore and one (2011) for the Glace Bay area. There were continued decreases in spawning stock biomass recorded for Little Hope and Halifax/Eastern Shore areas, while Glace Bay again showed virtually no fish in the one survey completed in 2011.

COMMENTS AND DISCUSSION

It was explained that the standard errors of the acoustic estimates outside the Scots Bay survey box were much higher than those inside the box because of the much higher sampling intensity inside the survey box. The standard error was weighted and pooled, not simply added.

The biomass estimates in the working paper were different from the initial estimates that were given to the fishing industry in 2011. It was noted that these had been initial estimates, subject to change upon further analysis.

Surveys were conducted on spawning fish, but often there were pre-spawners present. It is not known how long it takes for a herring to progress to spawning but it is assumed that this

generally takes less than a week. However, environmental triggers may lead to more rapid or slower spawning.

Research Recommendation: Instigate studies to see how long it takes a herring to progress from a stage 5 to a stage 6 maturity.

It was noted that surveying now starts earlier in the year on Scots Bay than it did in the past (<2005). Therefore there may have been fish in Scots Bay in the past that were not surveyed. Surveying in 2012 on German Bank also started early and lasted until the third week in October.

It was noted that the acoustic catch at age bubble plot for German Bank might not be consistent with the tables in the working paper.

Action: Check that the numbers in the German Bank bubble plot are the same as those in the tables.

There was considerable discussion about the sampling protocol and how the samples influenced the calculated biomass from an acoustic survey. It was noted that fish of less than 23cm are considered immature. This is not a hard and fast rule, since sometimes exceptions occur, but in general it holds to be true and these fish are deducted from the total biomass estimate. Scots Bay samples tended to consist almost entirely of mature spawning fish but German Bank is a feeding and spawning ground so there is more of a mixture. Samples taken within 3 days of the acoustic survey were used to characterize the target strength. Seiner samples were considered to be unbiased and samples taken with multi-panel nets were weighted by the catch of each panel

The acoustic surveys are not absolute estimates of biomass but can be used as a relative index to determine trends. The limit reference point is based on the trend. The next step would be to come up with absolute estimates as recommended in the framework, but this requires further work on issues such as target strength and quantifying double counting and emigration.

After the discussion on the acoustic surveys on the Nova Scotia / Bay of Fundy spawning component concluded, the meeting returned to Working Paper 2013/21.

Working Paper: Singh, R., D. Knox, M.J. Power, A. MacIntyre, and G.D. Melvin. 2013. 2013 Evaluation of NAFO Divisions 4VWX herring. CSA Working Paper 2013/21.

Presenter: Rabindra Singh

COMMENTS AND DISCUSSION

Limit Reference Point

This metric is referred to in the working paper as the "Lower Limit Reference Point", the "Lower Reference Point" and the "Limit Reference Point". In the Science Advisory Report and the Research Documents, it will be referred to consistently as the Limit Reference Point or LRP.

Action: The Science Advisory Report (SAR) and the Research Documents will refer to the Limit Reference Point (LRP).

The acoustic survey information from 2005 to 2010 was used to determine the LRP. In 2011 and 2012, as a result of the increase in the estimates for Scots Bay, the combined acoustic survey estimates were above the LRP and in 2012, the estimate was very close to the long term average. It was noted, however, that the overall average is not relevant for the determination of status in relation to the LRP.

There was discussion about the progress against the biological objectives (as stated in the Objectives and Management section of the working paper). The catch at age from the acoustic surveys cannot be used to determine the age composition of the whole population since the focus is primarily on the spawning fish and the fishery catch at age is influenced by market and behaviours such as the avoidance of small fish. It is therefore difficult to get a fishery independent measure of the age structure. However, older records from when catch was not limited by a TAC may be more representative and show a broader age distribution with older fish.

There is no consideration of the role of herring as a forage fish in this assessment. Without an analytical assessment it is not really possible to apportion mortality to different aspects of the ecosystem.

OFFSHORE SCOTIAN SHELF BANKS SPAWNING COMPONENT

Working Paper: Singh, R., D. Knox, M.J. Power, A. MacIntyre, and G.D. Melvin. 2013. 2013 Evaluation of NAFO Divisions 4VWX herring. CSA Working Paper 2013/21.

Presenter: Rabindra Singh

PRESENTATION HIGHLIGHTS

Landings from the offshore Scotian Shelf banks decreased from 11,862t in 2010 to 10,455t in 2011 and decreased even further down to 1,210t in 2012. There was no midwater trawl activity in the offshore area and only limited by-catch of herring from bottom trawl gear. No acoustic surveys were conducted in the offshore area in 2011 and 2012. Herring abundance in the 2011 summer bottom trawl research survey decreased from the 2010 high level in all areas except the Bay of Fundy. In 2012, herring abundance indices from the research vessel survey fluctuated with some areas decreasing and other areas increasing. This survey is not considered indicative of overall abundance due to changes in catchability for herring and a lack of year-class tracking.

COMMENT AND DISCUSSION

In 2011, at-sea fishery observers were present on three trips on 'The Patch' area and in 2012 only one trip had an observer. In 2011, the herring landings were above average and were caught primarily by purse seiners in early summer in the vicinity of "The Patch" and "Emerald Bank". In 2012, the landings were low and were caught by purse seine gear in early summer in the vicinity of 'The Patch' and Western Hole. In both years there was some by-catch from the groundfish and silver hake otter trawl fisheries on the Scotian Shelf.

It was asked if the participants in the offshore fishery were required to conduct acoustic surveys. There is an initial allocation of 12,000 mt which cannot be exceeded unless surveying is done. There has been no surveying in the past two years and it was noted by other members of the fishing industry that surveying the offshore is very expensive. Samples were collected from other fisheries and from the DFO summer research vessel survey. These showed age 7 fish were present.

This is a gap in our knowledge.

Recommendation: It is recommended that surveys be conducted on the offshore area.

Some members of the fishing industry felt that there is a strong link between the herring on the offshore Scotian Shelf banks and those in the coastal areas along the Eastern Shore. It was noted that from previous research it is known that spawning occurs on the offshore Scotian

Shelf banks but the exact spawning locations are unknown. No direct link between the Eastern Shore and the offshore Scotian Shelf banks has been proved.

Recommendation: Tagging studies and further surveying should be conducted to determine the movements of offshore Scotian Shelf banks herring and to examine a possible link with the inshore.

It was noted that tagging studies only work if there are fisheries to catch the fish in the areas to which they move. There were attempts to tag in these areas in the late 1990s but these were unsuccessful.

SOUTHWEST NEW BRUNSWICK MIGRANT JUVENILES

Working Paper: Singh, R., D. Knox, M.J. Power, A. MacIntyre, and G.D. Melvin. 2013. 2013 Evaluation of NAFO Divisions 4VWX herring. CSA Working Paper 2013/21.

Presenter: Rabindra Singh

PRESENTATION HIGHLIGHTS

Landings in the New Brunswick weir and shut-off fishery were 10,958t in 2010. Landings decreased to 3,711t in 2011 and further decreased to a historic low of 504t in 2012. It is notable that in 2007 landings were 30,944t, the highest in nearly 20 years. The age distribution of fish caught in the 2011 and 2012 New Brunswick weir and shutoff fishery were primarily juveniles, with 71% (2011) and 95% (2012) by numbers at age 2. The success of this passive trap fishery has been historically unpredictable, and catches are inherently susceptible to many natural variables in addition to abundance.

COMMENTS AND DISCUSSION

There was a precipitous decline in the number of active weirs in 2012. It was estimated by the industry that only about 50 weirs were built and the twine was often not put on until fish were seen. There was some effort in the shut-off fishery but no fish. 2011 and 2012 were disastrous years for the weir and shut-off fisheries.

COASTAL (SOUTH SHORE, EASTERN SHORE AND CAPE BRETON) NOVA SCOTIA SPAWNING COMPONENT

Working Paper: Singh, R., D. Knox, M.J. Power, A. MacIntyre, and G.D. Melvin. 2013. 2013 Evaluation of NAFO Divisions 4VWX herring. CSA Working Paper 2013/21.

Presenter: Rabindra Singh

PRESENTATION HIGHLIGHTS

The recorded landings in the gillnet and trap net fisheries along the coast of Nova Scotia decreased from 5,575t in 2010 to 3,606t in 2011 and to 3,007t in 2012. There were decreases in surveyed acoustic biomass in the Halifax/Eastern Shore area from the 27,000t in 2010 to 5,498t in 2011 and to 3,668t in 2012. In the Little Hope area, there was an increase in 2011 to 28,796t from the 26,700t in 2010. This was followed by a large decrease in 2012 to 12,756t. Only one survey was completed near Glace Bay in 2011 (51t) and none in 2012. No catch was reported in 2011 and very little catch reported in 2012 (7t). No herring surveys took place in the Bras d'Or Lakes.

COMMENTS AND DISCUSSION

In the working paper the catch at age for the coastal components combines the information from all the coastal components. However, the individual components (Little Hope, Eastern Shore, Glace Bay etc.) are considered separate spawning groups and therefore should not be combined.

Recommendation: In future, the catch at age should be done by individual coastal components.

A five year average of recent catches and/or 10% of surveyed acoustic biomass is used to set the annual removal limits for Little Hope/Port Mouton and Halifax/Eastern Shore.

Little Hope/Port Mouton:

In 2012 the Little Hope fishery was closed after two weeks because of the low quota based on the five year average. An industry representative noted that if the catches are low, then the amount of surveying is low and that brings the five year average down, meaning a lower quota. The representative indicated that a return to the survey, assess and then fish protocol was preferred. It was noted that this protocol is very labour intensive and DFO Science does not currently have the staff or the funds to return to this methodology.

East of Halifax (4W Eastern Shore)

Landings decline considerably in 2011 and 2012 in the Eastern Shore area and herring appeared to be scarce in the area. Industry representatives agreed with the views expressed in regard to Little Hope, indicating that a return to the survey, assess and then fish protocol in the Eastern Shore area was preferred. It was recognized that the manner in which the quota was set was not a Science issue, but one that needed to be raised with Fisheries Management. They expressed deep concern over the decrease in the amount of fish in their area and reiterated the hypothesis that fishing on the offshore Scotian Shelf banks might be impacting their fishery. It was noted by others that the large catch in the area in 2009 might be a contributing factor to the decline and indeed, there might be multiple reasons for the decrease in abundance on the Eastern Shore. Currently there is no clear evidence of a relationship between the offshore and inshore herring.

Glace Bay

There were no landings in 2011 and only 7t in 2012. Because of the lack of surveying, there is no acoustic estimate for this area.

Bras d'Or Lakes

The fishery remained closed. No samples or surveys have been taken or conducted since 2000.

UPDATE ON DFO/INDUSTRY COLLABORATIVE RESEARCH

CALIBRATION INTEGRATION FACTOR (CIF)

Working Paper: Melvin, G.D., C.D. Melvin, M.J. Power, S. Osborne, and A. Clay. 2013. Summary of calibration integration factor (CIF) corrections for the 1999-2002 herring acoustic surveys in NAFO Divisions 4VWX. CSA Working Paper 2013/19.

Presenter: Gary Melvin

Presentation Highlights

Acoustic surveys using commercial fishing vessels have played a key role in the assessment of the 4VWX herring stock since 1999. Currently the acoustic data collected by multiple vessels on several herring spawning grounds provides the only index of abundance for the stock. The 2004 herring Regional Advisory Process (RAP) reviewed a presentation on the Hydroacoustic Data Processing Software (HDPS) and recommended that a correction factor for the non-square waveform shape observed in a ball calibration be incorporated into the software. The RAP concluded that the inclusion of the CIF provided a more accurate estimate of biomass and recommended that all future analyses utilize the CIF to calculate biomass. However, because of the difficulties in applying the CIF to datasets prior to 2003, when comparing observations from year to year, it was recommended that the comparisons be made between biomass estimates that excluded the adjustment until a time series has been established with the CIF included. Recalculation of spawning stock biomass (SSB) estimates for the years prior to 2003 (1999 to 2002) using the CIF has been an ongoing process but has now been completed so that the entire time series of standardized surveys can be considered in the evaluation of stock status. Biomass estimates without the CIF should no longer be considered in monitoring/evaluating trends in abundance and will no longer be reported.

Comments and Discussion

It was noted that the biomass estimates with the CIF are higher in general than those without. There was discussion about how the standard error was calculated, with each transect being treated as a sample.

TURNOVER RATES FROM TAG RETURNS

Working Paper: Melvin, G.D., R. Martin, and M.J. Power. 2013. Estimating German Bank and Scots Bay spawning ground turnover rates from tag returns. CSA Working Paper 2013/20.

Presenter: Gary Melvin

Presentation Highlights

Approximately 23,000 spawning herring were marked and released on German Bank during the 2009-2011 spawning seasons with an overall return rate of 0.7%. These data were combined with data from previous Scots Bay and German Bank tagging studies in the analysis. Return data showed that a large proportion of the tagged fish were recaptured within two weeks after tagging; 87% in Scots Bay and 81 % on German Bank for all data combined. Current biomass estimates assume that fish remain in the same area for a maximum of 2 weeks before moving on. Based on these results double counting of spawning herring occurred in the annual biomass estimates of SSB for both Scots Bay and German Bank. Regression analysis indicated a strong relationship between the days at large and the proportion of fish remaining on the bank.

Correcting the 2012 Scots Bay and German Bank spawning biomass for elapsed time reduced the biomass from 397,590t to 308,069t or by 22.5%.

It is **recommended** by the authors that a review of this study and its result should be conducted at the next framework review to determine how these data should be incorporated into the assessment.

Comments and Discussion

If the tagging information was taken into account, it would reduce the acoustic estimates by 13 to 24% and would require a recalculation of the LRP. However, the acoustic estimates are used as a relative index and the tagging adjustments would be unlikely to change the trends.

The fish that were tagged were assumed to be spawners based on their size (>23 cm) and appearance. Samples were taken from the seine to verify that the fish were spawning.

It was noted, as in previous meetings where double counting has been discussed, that although it is possible that some fish remain on the spawning grounds for more than two weeks and get surveyed more than once, it is also possible that there are fish that move onto the grounds and then leave between surveys and are therefore not counted at all. The observation was made that along the Eastern Shore, fish used to stay down all day and night about fifteen years ago but now they disperse at daybreak. It was suggested that this is avoidance behaviour related to seal predation.

Recommendation: The implications of the tagging work and how it can be incorporated into the assessment should be addressed at the next framework meeting.

Other issues that were identified at the framework as precluding the use of the acoustic estimate as a measure of absolute biomass included target strength and the dead zone. Some work has been done on both issues and it is hoped that the work will be presented at the next assessment meeting.

It was noted that there is a history of collaborative research between DFO and the fishing industry which has contributed to the assessment of herring. The industry is unhappy with the loss of DFO funding and personnel and the demise of much of the research.

VALIDATION OF HERRING FISHERY EFFORT AND LANDINGS MAPS

Presenter: Scott Coffen-Smout

Oceans and Coastal Management Division is updating the previously published Scotian Shelf: An Atlas of Human Activities that mapped fisheries effort and landings from 1999 to 2003. This information is used to identify important areas of human use and can be used for a number of purposes including Marine Protected Area planning, Sensitive Benthic Areas Policy, Oil and Gas impacts and fishery related purposes. Presentations are being given at various meetings to stakeholder groups including advisory committee and assessment meetings in order to get feedback on the information that is being summarized. Scott's presentation, a backgrounder on the project and the link to the previously published atlas will be provided by email to the meeting participants so that they can provide feedback to him.

Action: Scott Coffen-Smout will email a copy of his presentation, background information on the project and a link to the original publication (Scotian Shelf: An Atlas of Human Activities) to the meeting participants so that they can provide feedback to him.

It appeared that herring weirs were not included in the traps and weirs category.

Action: Scott Coffen-Smout to check that herring weirs are included in the traps and weirs category.

Industry participants raised the concern about how this information would be used in the future and noted that fisheries move and change over time. Currently the situation is even more dynamic as fishing patterns change because of environmental changes. It is important to note that fisheries that you can't freeze the footprint of a fishery in time. It was also noted that the short time period that these data and the previous atlas cover does not go back far enough to see patterns and changes in the fisheries or potential regime shifts. It is good to have this kind of information going forward, but it is also important to have a better historical representation.

Purse seine effort and spatial coverage is not captured in the method used. Purse seiners spend considerable time searching over wide areas for herring before they set, but the methodology cannot incorporate this.

INTRODUCTION TO DAY TWO

The meeting reconvened on March 27th, at 8:30 a.m. The Chair welcomed participants back and indicated that the agenda would be adjusted so that after the summary of the proceedings of March 26, Dr. Singh and Dr. Melvin would present some homework from the previous day's deliberations. This would be followed by a discussion to address the term of reference reviewing interim/update reporting procedures. The focus of the group would then shift to the preparation of the Science Advisory Report.

HOMEWORK

Corrections to some tables and figures were presented. Some further information was presented comparing the German Bank spawning grounds versus the spawning box area used for the German Bank acoustic surveys. However, this did not clarify the issue for all meeting participants. It was recommended that the coordinates be checked and the data extraction repeated to ensure that the landings figures and areas examined were correct. It was noted that this could take a week or so to complete.

Recommendation: Check the coordinates and repeat the data extraction for the German Bank spawning grounds and the spawning box area used for the German Bank acoustic surveys.

REVIEW OF INTERIM/UPDATE REPORTING PROCEDURES

Presenter: Kirsten Clark

PRESENTATION HIGHLIGHTS

Currently Fisheries and Oceans, Canada is moving away from conducting full assessments every year. It is expected that in 2014 there will be an update provided for 4VWX herring rather than a full assessment.

The update would consist of:

- For SWNS/BoF spawning component:
  - Update of the acoustic survey index
  - Table of conservation objectives

- For the coastal components:
  - Update of the acoustic estimates
- For the offshore and the weirs:
  - Brief summary of landings and catch and the results of any surveys

The methodology would follow what was established at the framework eliminating the requirement for a full meeting for review. Potentially the review could be done virtually by circulating the information to key people, but it has yet to be decided who these people should be. Should it be just science, or should Fisheries Management and Industry be included?

In the long term there is the suggestion that frameworks and assessments would likely merge and be held about every 5 years with updates in between unless a red flag is raised by an update – i.e., something dramatically different happened like the acoustic index decreased or increased precipitously. A framework would include new methods and new models.

COMMENTS AND DISCUSSION

Participants in the current meeting expressed the opinion that an update procedure without a formal Canadian Science Advisory Secretariat assessment meeting was acceptable as long as all the same information was available and was provided to the industry and others in person at a meeting. A teleconference or a written report would not be sufficient. Industry and Fisheries Management participants felt that it was important that they be included in any update review process, and that this review should not be restricted only to Science.

DRAFTING OF THE SCIENCE ADVISORY REPORT

The remainder of the meeting was spent editing the draft Science Advisory Report which was presented to the group by Dr. Singh. The agreement was to go through the SAR section by section to ensure that the text accurately reflected the information presented and the decisions and conclusions of the meeting. Additions and changes to the document were made in real-time as the group directed.

SUMMARY AND CLOSING

At the conclusion of the meeting there was consensus on the draft Science Advisory Report including the Summary Bullets. The Chair indicated that once minor edits to figures and texts were made as requested, the SAR would be circulated to all participants for information.

The Chair thanked all the participants for a productive meeting and for their helpful comments and suggestions throughout. She specifically thanked the herring assessment team and reviewers for their contributions to the process. The meeting was adjourned.

APPENDIX 1: Meeting Agenda

Assessment of 4VWX Herring
Regional Peer Review – Maritimes Region

26-27 March 2013

Bedford Institute of Oceanography
Dartmouth, NS

AGENDA

26 March 2013 – Tuesday

09:00 – 09:15 Welcome, Introduction, and Review of Agenda

09:15 – 10:00 Nova Scotia / Bay of Fundy spawning component

10:00 – 10:15 Break

10:15 – 12:00 Nova Scotia / Bay of Fundy spawning component (continued)

12:00 – 13:00 Lunch

13:00 – 14:45 Review of Offshore Scotian Shelf spawning component, and coastal Nova Scotia and New Brunswick coastal components

1445 – 1500 Break

1500 – 1600 Update on DFO/Industry Collaborative Research

1600 – 1630 Validation of Oceans Management's Herring Fishery Effort and Landings Maps

1630 – 1700 Review of Interim/Update Reporting Procedures

27 March 2013 – Wednesday

8:30 – 8:45 Review of Previous Day

8:45 – 10:15 Review of 4VWX Science Advisory Report

10:15 – 10:30 Break

10:30 – 12:00 Review of 4VWX Science Advisory Report (continued)

12:00 – 13:00 Lunch

13:00 – 1500 Review of 4VWX Science Advisory Report (continued)

APPENDIX 2: Terms of Reference

Assessment of 4VWX Herring
Regional Peer Review - Maritimes Region

March 26-27, 2013

Bedford Institute of Oceanography
Dartmouth, N.S.

TERMS OF REFERENCE

Context

Maritimes DFO Resource Management has requested that DFO Science undertake an assessment of the 4VWX herring management unit in support of the 2013/2014 and 2014/2015 fisheries. The last assessment of 4VWX herring was conducted in April 2011 using a new assessment framework.

Objectives

Review and evaluate biological and fishery information on 4VWX herring stock status to assist with establishing the final quota for 2013/2014 and 2014/2015 fisheries, as required in the Integrated Fisheries Management Plan, including but not limited to:

- An evaluation of the southwest Nova Scotia / Bay of Fundy spawning component.
- A compilation and review of information regarding the offshore Scotian Shelf spawning component and the coastal Nova Scotia spawning component.
- An update on southwest New Brunswick migrant juvenile fishery component.
- Evaluate the status of the fishery with respect to the conservation Lower Reference Point

In addition, provide advice on the recovery and rebuilding of 4VWX herring, and review reporting procedures to be used for stock status updates until the next formal assessment.

Review results from the Ecosystem Research Initiative and their implications for herring stock status and productivity.

Expected Publications

- Science Advisory Report
- Proceedings
- Research Documents

Participation

- DFO Science
- DFO Resource Management
- Provincial government (fisheries)
- Herring fishing industry
- Aboriginal communities/organizations

APPENDIX 3: List of Participants

Assessment of 4VWX Herring
Regional Peer Review - Maritimes Region

March 26-27, 2013
Bedford Institute of Oceanography
Dartmouth, N.S.

PARTICIPANTS

Name	Affiliation
Aldous, Don	Herring Science Council
Baker Stevens, Nellie	Eastern Shore Fisherman's Protective Assn. (ESFPA)
Boone, Brian	NB Dept. Agriculture, Aquaculture & Fisheries (NBDAAF)
Bundy, Alida	DFO Maritimes / Ocean & Environmental Science
Clark, Kirsten	DFO Maritimes / Population Ecology
Clay, Allen	Femto Electronics Limited
Couture, John	Unama'ki Institute of Natural Resources (UINR)
d'Entremont, Kim	Comeau's Sea Foods Limited
d'Eon, Glenn	Southwest Seiners Co.
d'Eon, Sherman	Cape Breeze Seafoods Ltd.
Doucette, Delma	Vonndel II Fisheries Ltd.
Fry-Buchanan, Joy	Full Bay Scallop Assoc. (FBSA) / Atlantic Herring Co-op
Holland, Peter	Fundy Weir Fishermen Association
Hooper, Tony	Connors Bros. Clover Leaf
Hubley, Brad	DFO Maritimes / Population Ecology
Kaiser, Tim	Scotia Garden Seafood Inc.
Lent, Jemie	DFO Maritimes / SWNS - C&P
McEachreon, Tom	NB Dept. Agriculture, Aquaculture & Fisheries (NBDAAF)
Melvin, Gary	DFO Maritimes / Population Ecology
Nasmith, Leslie	DFO Maritimes / Population Ecology
Partington, Peter	Little Hope Fishermens Association
Robicheau, Lloyd	Eastern Shore Fisherman's Protective Assn. (ESFPA)
Saulnier, Billy	Comeau's Sea Foods Limited
Saulnier, Brian	SeaCrest Fisheries
Singh, Rabindra	DFO Maritimes / Population Ecology
Stewart, Dick	Full Bay Scallop Assoc. (FBSA) / Atlantic Herring Co-op
Stirling, Roger	Seafood Producers Assn of NS (SPANS)
Waters, Christa	DFO Maritimes / Resource Management